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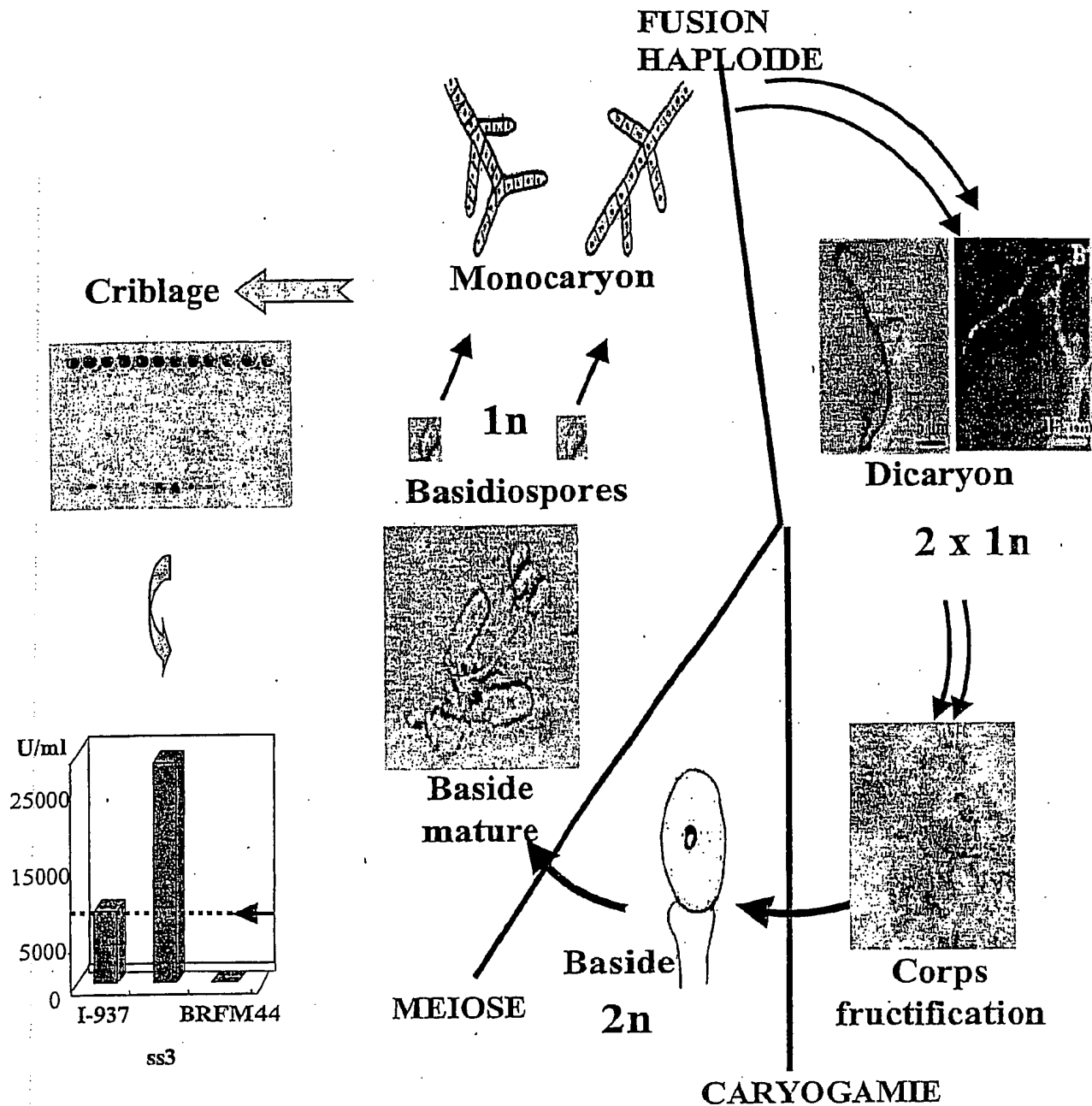


Figure 1 : Isolement de souche monokaryotique déficiente pour l'activité laccase

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2/13

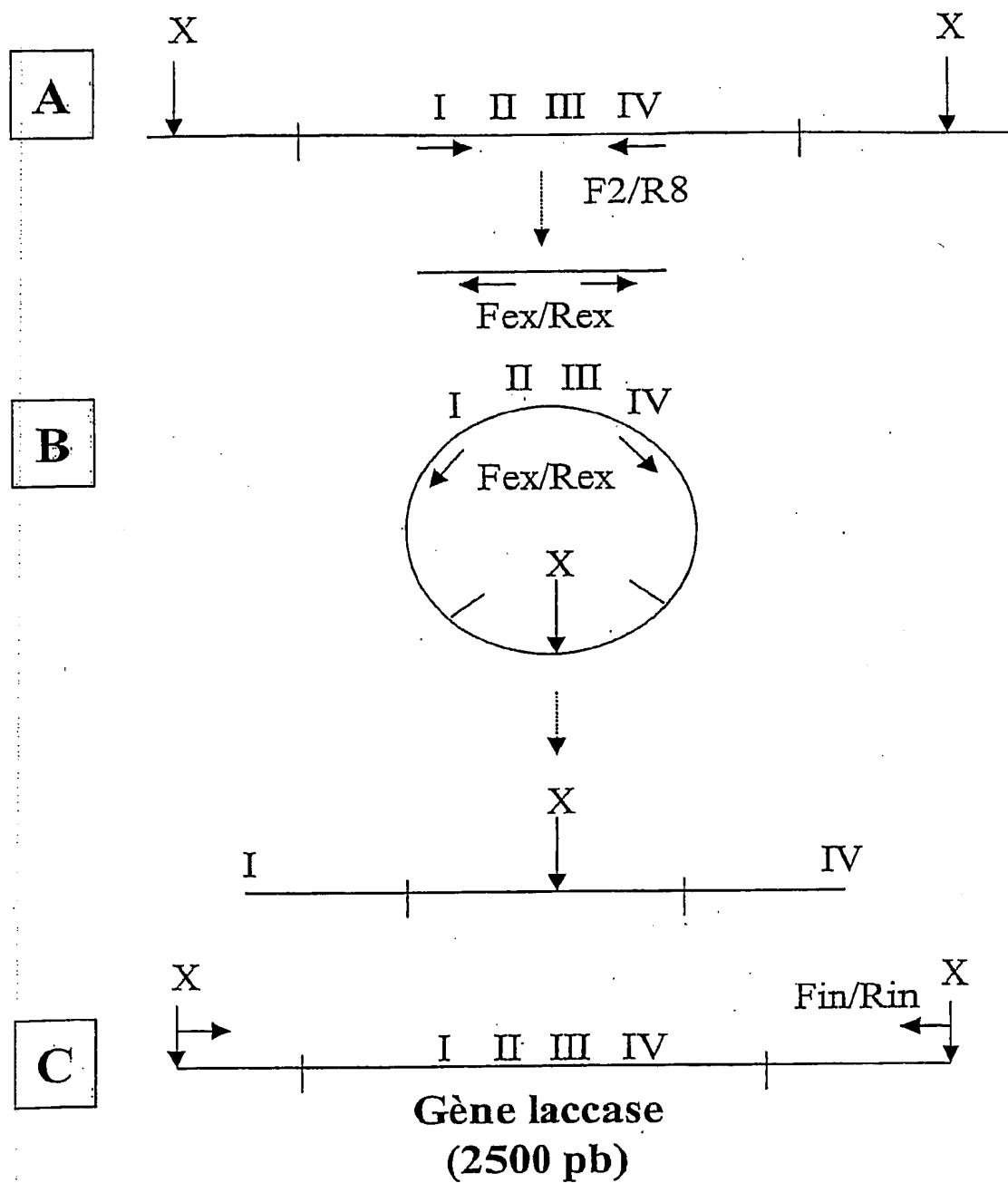


Figure 2 : Isolement du gène codant pour la laccase de *Pycnoporus cinnabarinus* laccase

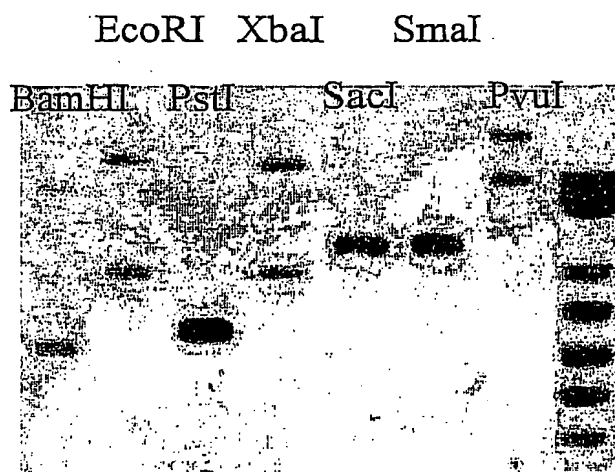


Figure 3 : Etude en Southern blot du gène codant pour la laccase de *Pynoporus cinnabarinus*

CTGCAGACATCTGGAGCGCCTGTCTTCCCTAGTATATAATGATGTCTGTCCGACAGTCTCTGAAGACCGCTCGAGTCCCACCTTGAGTTTATAGGTAGGAC	100
CTGTCCACCAAAACCCCTCTTCTGATCATGTGAGGTTCAGTCCCTCTTCTTCTCGTCTCTCCCTCACCGCTGTGGCCAAACGACGCATAGGGC	200
M S R F Q S L F F F V L V S L T A V A N A A I G P	25
CTGTGGCGGACCTGACCCCTTACCAATGCCAGGTCCAGCCCGATGGCTCGCTCGCGAGGCGCTGTGGTGAACGGTATCACCCCTGCCCTCTCATCAC	300
V A D L T L T N A Q V S P D G F A R E A V V V N G I T P A P L I T	58
AGGCAATAAGGtatgtatgtcgtcgtccctcagagctacatacatctgatcccaatcgtttagGGCGATCGATTCCAGCTCAATGTCTATCGACGAG	400
G N K G D R F Q L N V I D Q	72
F2	
TTGACAAATCATACCATGTTGAAACATCTAGTATTgtagggttcagtttttcccgactaccstgttatgaccatcccaactcgtag CATGGCCAGG	500
L T N H T M L K T S S I	
CTTCTTCAGCAGGACGAACTGGGCGGATGGTCCCGCGTCTGTGAACAGTGTCCCATCGCTTCGGGCCACTCGTTCTTGTATGACTTTCAGTTCC	600
F F Q Q G T N W A D G P A F V N Q C P I A S G H S F L Y D F Q V P	121
(I)	
GACCAAGCAGgtacgaattccgtacacgtttcatgtcgtcgcaataaacctcctcttactaggGACTTCTGTTACCATAGCCATCTCTCCACGCAATA	700
D Q A G	
(II)	
CTGCGATGGTTTGGGGGGCTTTCGTCTCTACGACCCCAAGATCCTCACGCTAGCCTGTATGACATTGATAACGgtgagcagatcatggtatcgc	800
C D G L P F V Y D F N D P H A S L Y D I D N D	163
tattcgtccacttatgcttccgtgcatccagACGACATGTCTACGCTGGCTGATTGGTATCAGCTGTGCTGCAAGCTCGGACCTCGCTTCCCGtac	900
D T V I T L A D W Y H V A A K L G P R F P	184
gtgtcaastgtctacgagagatctcacatatacgtactagctcacttcgtgattacagATTGGCTCCGATTCAACCTTATCAATGGACTTGGTGGAA	1000
F G S D S T L I N G L G R T	198
CCACTGGCATAGCACCGTCCGACTTGGCAGTTATCAAGTTCACGACGGGCAAGCGgtaatgtatggtggtcactcactgcacattggtctgatacatggc	1100
T G I A P S D L A V I R V T Q G K R	216
ctgtttccacagCTACCGCTTCCGCTTGGTGTCTCTTCTTGGCATCCGAACCATACATTACGATTGATAATCACACARTGACTATAATTTAGGGCGGA	1200
Y R F R L V S L S C D P N H T F S I D N H T M T I I E A D	245
CTCGATCAACTCAACCCCTAGAGGTTGATTCAATCCAGATTTTTCCGCGCAGCGCTACTCTTCTGtgtagg tctgtaggctcctgtcatcaagtttg	1300
S I N T Q P L E V D S I Q I F A A Q R Y S F V	268
cagacattccttagatacaccttttcaatgcagCTGGATGCTAGCGACGGGTGGATAACTACTGGATCCGCGCAACCCCTGCTTCCGAAACACAGGTT	1400
L D A S Q P V D N Y W I R A N P A F G N T G F	291
TTGCTGGTGAATCAATCTGCCATCCTGCGTTATGATGGCGCACCCGAGTTCAGCTTACGCTTCTGTCAGACTACTCTACGAAGCTCTGAACGAGGT	1500
A G G I N S A I L R Y D G A P E I E P T S V Q T T P T K P L N E V	324
CGACTTGCATCCTCTCTCGCCTATGCGCTGTgtacgtgtctcaagaaacctcgatcactaagtgcatgtcaactcatatggtgcatgacagCCTGGCAGC	1600
D L H P L S P M P V	
CCCGAGCCCGGAGGTGTGCGACAAGCCTCTGAACTTGGTCTTCAACTTCygtgagtactggcgcttccgtagcacacgttcgaacaaagcctgataccat	1700
P E P G G V D K P L N L V E N F	
gcagAACGGCACCAACTCTTCATCAACGACACACCTTTGTCCCGCGCTCTGTCCCAGTCTTGTACAAATCCTCAGTGGGGCGCAGGCGGCTCAGGAC	1800
N G T N F I N D H T F V P P V L L O I L S G A Q A A Q D	385
CTGGTCCCGGAGGCGAGGTGTTCGTTCTTCCAGCAACTCGTCCATTGAGATATCCTT CCCTGCCACTGCCAATGCCCTTGGATTCCCCCATCCGTTCC	1900
L V P E G S V F V L P S N S S I E I S F P A T A N A P G F P	419
(III)	
ACTTGCACGGTgtacgtctgcttccctcgtctaaaggcggagtcgatatctgactcccatcacagCACGCCTTCGCTGTCTCGTCCGAGACGCC GGGAGC	2000
L H G	
(III)	
AGCGTCTACAACCTACGACAACCCGATCTTCCGCGACGTCTGTCAGCACCGGCGAGCCCGGCGACR ACGTCACGATTCTGCTTCGAGACCAATAACCCAGGCC	2100
(III)	
S V Y N Y D N P I F R D V V S T G Q P G D N V T I R F E T N N P G P	467
R8	
CGTGGTCTCTCCACTGCCACATTGACTTCCACCTCGACGCGAGGCTTTGCTGTAGTCATGGCCGAGGACACTCCGGACACCAAGGCCCGGAAC CCTGTTC	2200
W E L H C H I D F H L D A G F A V V M A E D T P D T K A A N P V P	500
(IV)	
TCAGGCGTGGTGGGACTTGTGCCCATCTATGATGCACTTGACCCAGCGACCTCTGAGCGGATTTGTACTGTGACCTGGT GTGGGGGAACATGT CGA	2300
Q A W S D L C P I Y D A L D P S D L	518
GGGCTTTCATCGATCAGGGACTTTCAAGGTTGGCATAATATACCTCACGCGCTGGATGACTCGGACAGCGTGTGGGCGTGGGTGTAACCTCTGCTTGATGT	2400
TGAAAAAGGATTTTATGTAGAACAATTATGAGCAATCAGCAATCAATAGGATTGTGTCTGGTTTCAGCAAAATGTCTTGTCTCCCTGACATTACTTTTG	2500
TGCGAGAAATGGGTCCATGATACATCATTTGAGCTCTCAATACCAAGAAGGATTACCCATGTCAATACCAAGATCATGTCTTCTGCTGTCCGCAATGG	2600
TCTCATGTTGCGTTGAGCAGATCGCAGTACGTTGAAAAGCGATTAGTAT TACATGCAACATGCAACATTTGGAAGGGGGCATGCAGAGGTTTCAGCTCGCG	2700
TCAGTCCGCCAAGTAGCGACCTTTGCCGCACTGCTGTTAACTGAAGGTATGCTTCAGAACTCCGTGGTATCGAGAGCGATCGTGTACGTTCCGGGAT	2800
AGATCCATTGATCCCCGCTCTGGTCCGGCGGTGCGATGGCCCCGAGCGTCAACGGCAGCTTCGCGATCGCGCTTTTCTAGGGGCGAGGCCGTGTACCCG	2900
CGTGTACGAGACGAGCTGCTTGTTCGGGTGGGGCGAAGGCCCGAAGGAGGCCACTCACGAAGAGCAATGCGACGTAAATCCGAGGTAGCCTTGCCCGTGT	3000
GTCACACGCGAGGAGACGTGTGAGCGGCGCGAGGTCAGGAAGCGCGCGCTCTTCTGACCGGCTGTACGAGGTGCGAAATCGAATACGTGATGGCG	3100
GTCCTCCAAAGTCCGTGACGTTGGTTCGATCGGCGCGCGCGCTGGAGCTGCCCAAGAGAAATCGAAGGTGGTGAAGTGCAGTCCAAAGCCAAATTCGTA	3200
GACCGCGTCCCGGTGTACCACTTGTATGTACGCCCGGGTTCGACGCGCTTGGGGCAGGGGT CATGTCACTCATCGGAACCTGATCAGCGTAGATGGCT	3300
GGGTATTGGGTGATGGGCGAGCGCTCTGCGAG	3331

Figure 4 : Séquence du gène codant pour la laccase de *Pycnoporus cinnabarinus*

AGATCTCCGAACCAGAAATGCGATTGCGTTTCAGGCCCAATTAAGAATAAAGCTGCGTCAGGGCAGCGACGTA
TCTTGATCCATCATTGACTCACCGGCATCGGGCTCAACACCAAAGCAAGCTCGTCCCACCCATAGGCGTGCA
CCGGCCGGCGTGCGCCATTGAGGTACATGAGCGGGGCGAAAGTCCGCCATTGGTAGCCCTGTCGTGGACGCG
CGGCGATGAAACGTTTCCCAACATTGGGAAGAAACGTCTGCGGCCCATCATCCCTTCACCGGATGACAAGGC
GGCGTCGCGCCTTTGCCGCGAGAGGCCGGCGGGCGACATGCACAGCGAAGGTCCGTTGCGGATGGGAAGCAGG
CAATCAGTGGGTGTCTACGCCGCCACGATGGTTCGGGGAGCGTAGGCGCCCTCCCATAAAGCGGCAAGCATC
ATGATGCTCTCCGATTCCGGGAAGCCTGGTGCGATGCTGGAGAGACTCTCTCCGAGAGACCAGTGTGCGCAAC
GTTCTGGCCTGGAAGACTTTAAAGTGAGTGTAAGGGCGAGCAGAGGACGATCATCGGATTGCAGGAACC
ATCGGCATCCTCAGCCTGGGAAGGATGGCTCTTGGTAGACATTGCGGGAAGGTGTCTAGATGTGAGCGGGC
TTCTTGGATGATCATGTGTAACTTTTCTGACCTCGTCGGTGGTACGCATGGCAGGATTGAGCATTACGGT
ATGCCTCCCATTCATAAACGATAACCCCTTCTTTCAGGTTGGTCATCTCCATAGAGCGGCACGCTCTCAAGG
CCTAGGCTATTACACCTCCTTCGCAACATCCCTATTACGGTGTCTGTAAGGAACGACTTGTTCATGGGATC
ACATGAAGTGCAGCATACTGTTCCGCCGTCTCGCAGTACAGACGCTAGTACGGGAAGTCGACATCCAAGCGT
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TCATGAGGGAATGCCACCGGATAGGGTGTGGCGGCCGCAATATTTCATCGCCTGGCAATAGTCGATGTGCGT
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GCAGGCATCGCGCAACAGATCCCAGCCATCCGGCCTCTGACATTTCGGGATACCTGAAGCCCTTCAGGTACGG
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GTGAAAGGCTCCATCATATAGCGGCTCAACTCTACCTCGAATGTCCAAACACGGCGGGAATACTTATTTATG
TGGACAAGGCCGAGCTATGATAGCTTGCTCCCGAAGTTGGTAAGTCCCGCAATCTCGGGTTCAGGCAACAGT
CTCGGAAAAATAAGAAGAATATTGTAGGTGCGTGTAGGCGTATCGCCCAAATGCGCACACACGGAGGCTTTA
GGAGATGAAGCGCCCGTGAGCGGTAAAGGGAGTTGGTTACCGCCGCCCGACCGACTCTCTCTCTTTCCAG
CATCATGTCTCGGCGCAAACTTTACCCTCTATTGACCAACTCCACGAGAAAGCAGGAACAGCTTCCCTTGCT
CTCATGACGTCCGCAATCCAGACCCTTAGCCGGTTCGTTACTCATCGTTATCCCTGCCGCCATGGTAGTGGA
GTCAGCCTGGCCAGTGCGTAGTCCCGTCTCTCTTGCTGCACTAGAGAAGCCCCATGAGACAGCGTTTTTTCG
TTTATTTCTGCTGTTTCTATAGACACCATAGGGGCAACGATCCTGCACGCCAGAGGTATGGGGCTCGTCA
GATTCCAGTTTTTCTCCTCGGTCTGAATCGGCTGCACGGCAGATAAAATCGGCCGGAAATGCTATAGCCCTT
CATAGCCCGCTATGAGAGTCGCAAAAGGCTTGTGAGTCAGGTTCGGTCGAGTGGCTCTCACGAAGAGCGTCAA
CTTCGCGCGACAGCCGCTTTCAGGGCAAGATAGATCCTCCCATCATCCCCTACTGCGCTCAGCGCCGGTAC
CGAACAATTGACTTACCGACATCCTCCGGGACGCGCAATGCTGTTTCGACGGAACGTAATCCTCTTCGTCCC
GCCTCTTTTCGCTCTCACGCATTCCTGTGTGGTTCGCGCGACGGCCGCTCATCAGGACCAGACCAGTCTCAAT
GTCTGGTACCGGCACAATGGTGACACTGCGGCAACTGAGTAGGTCTGGTCACTCTGGTGCACCGTCGCTTAC
GCTGACCTTCGGGATACTGTCTGACAGACATCTGGAGCGCCTGTCTTTCCCTAGTATAAAATGATGTCGTGTC
CGCAGGTCTTGAAGACCGCTCGAGTCCCCTTGAGTTTTAGGTAGGACCTGTCCACCAAACCCCTCTTTCT
GATCATG

Figure 5 : Séquence de la séquence promotrice du gène codant pour la laccase de *Pycnoporus cinnabarinus* (jusqu'à l'ATG codant pour la méthionine de la laccase)

6/13

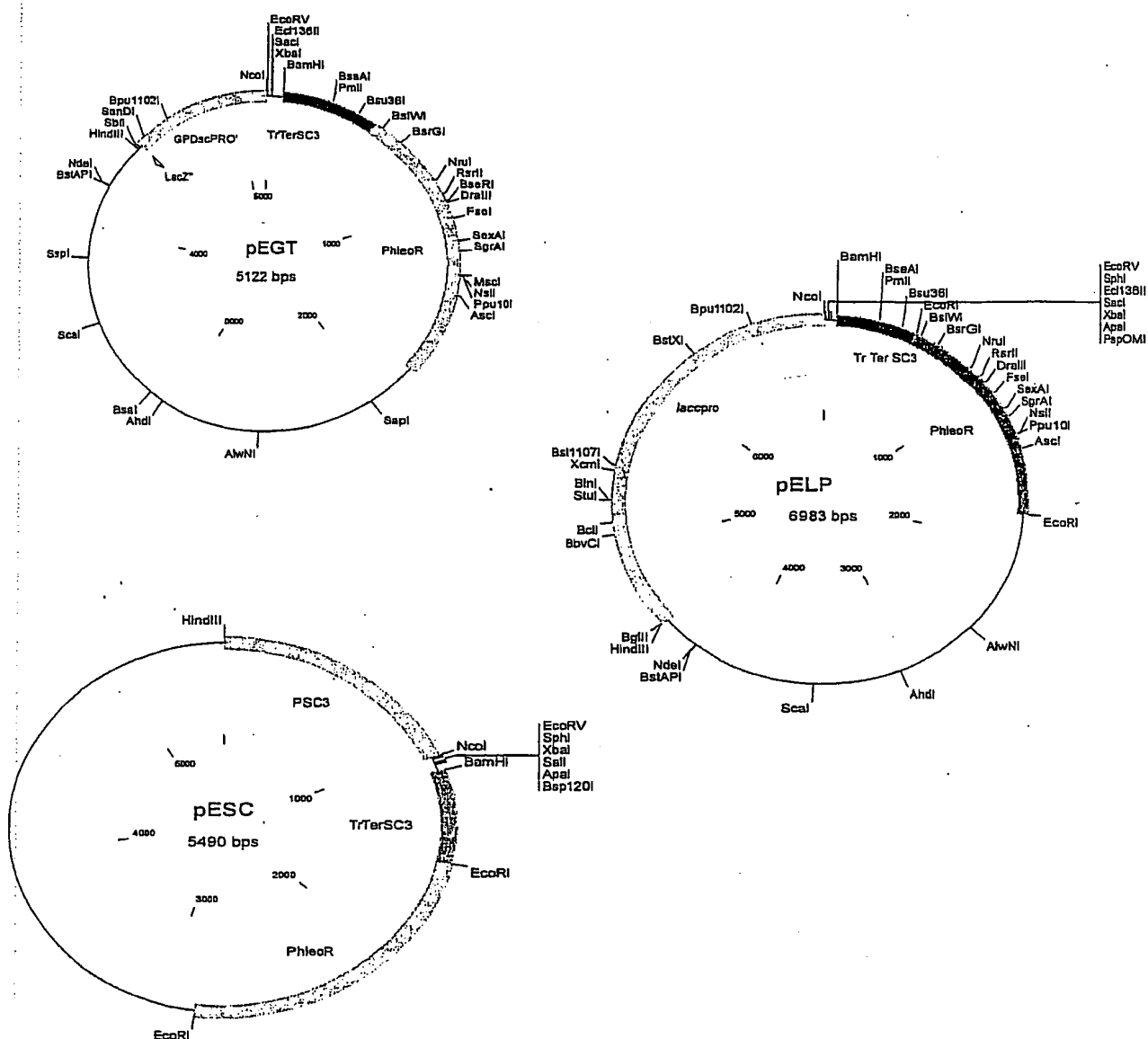


Figure 6 : Carte physique des trois vecteurs d'expression utilisés pour la production de la laccase chez *Pycnoporus cinnabarinus*

CATGGGATATCGCATGCCCTGCAGAGCTCTAGAGTCGACGGGCGCCGCTAACAGCGGTGGATCCGCGAGGTGAAC
GCGCCTATCGGTGGGATATTCCGGCGACGGGAGCCTCGGCAATCTGAGCCTCGTTACTGCCTAGCAAAATCGGAATCCCTTCGATGT
CATAGGGTCGCGGACAAAGTGATCGTCTTGCTACATACCTCAAGGTGTTGACTCATTCCCTCGATAATGAACATTGTTGTTGTTGTTG
TTCTCTATCCGCTCAGTCACGCGACCCACACGTGCATGGTTGAACCTTCGCCACGCAACAAACCGCATGACGACATGGCGAACCTAAG
TAAAGGCTGAGTCGTGGACTAAAGCACTCCACTTTACGGCGAGGATGCCAGTCTACGTCAATGAAGCCTCAGGTCCCGAAGTAA
GGGGGTACAAAAGGAGGGTGAAAGGTGGACGTTTTCTTACCATCCTTCCACCTCCAGACCACCATGCCGGGAATTCACAGCTTGCT
CAAAAAGGTTCTGCCGTACGCCCGCGAAAATTCCTTCGAGGTGGGCCCTATCGCATACATGCACGACTTCAAAACA TCCATTCTATC
ATTTTGGGATCGTACAAATTATTAGACATGTTGTACAACGTTACATTCCTTTCTTTTACTCTCCGGCCAGTCTATGTAGAGGTAAA
GTACAAGCGTCCAAAGGATCAGGCACTTAGAGCGCGCGCTTGCTTCGCCGCTTAGAGCGCGCGCTCTGCTTCGCCGCGTAGACG
AGCAGGTCCGAGACACGGCGGGAGTAGCCCACTGCTGTCGTACCGCGCTGATGAACAGGTCACGTCGTCCCGGACCACACCGGC
GGGATCGATCCACGCGTCTTAAGGCGCGCGGTACCCCTCGGACCCGTCGGGCCGCGTCGAGCCGCGGTGTTGCTGATCGCGATGCCG
TCAGTCTGCTCCTCGGCCACGAAGTGCACGCAAGTTGCCGGCGGGTGCAGCGAGGGCGAACTCCCGCCCCACGGCTGCTCGCGAT
CTCGGTTCATGGCGCGCGGAGGCGTCCCGGAAGTTCTGTGGACACGACCTCCGACCACTCGGCGTACAGCTCGTCCAGGCCGCGCAC
CCACACCCAGGCCACGGGTGTTGTCGGCACCACTGCTGTCGTACCGCGCTGATGAACAGGTCACGTCGTCCCGGACCACACCGGC
GAAGTCGTCTCCACGAAGTCCCGGAGAAACCCGAGCGCGTCCGTCCAGAACTCGACCGCTCCGGCGCGCGCTGCGCGGTGAGCA
CCGGAACGGCACTGGTCAACTTGGCCATGCATGGTGATGGGCATTATGTGTGATGGGATGCGATGGGAGAGGGAAGTCTGTGGATG
GGAGTGTGGAGAAAGAGGAGAGCGCGCGCGCGCTTTATACCCAGCGCCGAAAGATCCGATCGTACTGACAAAACGGGA
TGAACACATCGCGCGCGCGCTGGACTGCGCGCCATCTGCAATGCCAGCCAGTCCCGTCGGGCGCCACCAACAGCCCTGGTCGAGT
CCCCCTCGAGGGCGACGCTCTATTCTATCCATGCGCGCAATTGCAAGTGCAGGTCGCGGTGCAAGAACAGTCTTCGAGTCTTCTCGCAC
TGGGCTGCGACCTGTCTACCTCTCATCTTAACCCCTCCGCGGCTTCGCACTACAGTTACTAATCTCACACCGAAGAGGCTCTCGCGC
CACCTCCGATCCCGAGCACGTTCTTACATGCCACAGCGTCAGAAATGAACACAAATGCACGTCARATCAGATCCCGGGAAATTCGT
AATCATGGTTCATAGCTGTTTCTGTGTGAAATTTGTTATCCGCTTCAAAATCCACACAACATACGAGCCGGAAGCATAAAGTGAAG
CCTGGGGTGCCTAATGAGTGAGCTAACTCACATTAATTGCGTTGCGTCACTGCCCGCTTTCAGTCCGGAAACCTGTCGTGCCAGCT
GCATTAATGAATCGGCCAACCGCGGGGAGAGGCGGTTTGCATTTGGGCGCTTTCGCTTCTCGCTCACTGACTGCTGCGCTCG
GTCGTTGCGGTGCGCGGAGCGGTATCAGCTCACTCAAAGCGGTAAATACGGTTATCCACAGAATCAGGGGATAACGCAAGAAAGAA
CATGTGAGCAAAAAGGCCAGCAAAAAGCCAGGAACCGTAAAAAGCCGCGTGTGCTGGCGTTTTCATAGGCTCCGCCAGCAAG
AGCATCACAATAATCGACGCTCAAGTCAAGGTGGCGAAACCCGACAGGACTATAAAGATACCAAGGCGTTTCCCCCTGGAAGCTCC
CTCGTGGCTCTCTCTCGTCCGACCTGCGCTTACCGGATACCTGTCCGCTTCTCCCTTCGGGAAGCGTGGCGCTTCTCATAGCTC
ACGCTGTAGGTATCTCAGTTCGGTGTAGGTGCTTCCGTCCTCAAGCTGGGTGCTGTGACGAAACCCCGTTCAGCCGACCGCTGCGCC
TTATCCGGTAACATATCGTCTTGAGTCCAACCCGTTAAGACACGACTTATCGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCA
GCGAGGTATGTAGGCGGTGCTACAGAGTTCTTGAAGTGGTGGCCTAACTACGGCTACACTAGAAGGACAGTATTTGGTATCTGCGCT
CTGCTGAAGGCACTTACCTTCGGAAAAAGAGTTGGTAGCTCTTGATGCTTCGCGCAACAAACCCGCTGGTAGCGGTGGTTTTGTTT
GCAAGCAGCAGATTACGCGCAGAAAAAAGGATCTCAAGAAGATCTTTGATCTTTTCTACGGGGTCTGAGTCTGTTTCTGTT
AACTCAGTTAAGGGATTTTGGTCATGAGATTATCAAAAAGGATCTTCACTAGATCTTTTAAATTAATAAATGAAGTTTTAAATCAA
TCTAAAGTATATATAGTAAACTTGGTCTGACAGTTACCAATGCTTAATCAGTGAGGACCTATCTCAGCGATCTGTCTATTTCGTTT
ATCCATAGTTGCTGACTCCCGCTGCTGTAGATAAAGTACGATCGGAGGGCTTACCATCTGGCCCAAGTGTGCAATGATACCGCG
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CGCTCCATCCAGTCTATTAATTGTTGCCGGGAAGCTAGAGTAAGTATGTTCCGCCAGTTAATAGTTTGCAGCAACGTTGTTGCCATTGCT
ACAGGCTCGTGGTGTCAAGCTGCTGTTTGGTATGGCTTCACTAGCTCCGTTCCCAACGATCAAGGCGAGTTACATGATCCCGCA
TGTTGTGCAAAAAAGCGTTAGCTCCTTCGGTCTCCGATCGTTGTGCAAGTAAGTTGGCCGAGTGTATCACTCATGTTATGGC
AGCACTGCATAATCTCTTACTGTATGCCATCCGTAAGATGCTTTTCTGTGACTGGTGAAGTACTCAACCAAGTCATTCTGAGAATAG
TGATGCGCGACCGAGTTGCTCTTCCCGGCGTCAATACGGGATAATACCGGCCACATAGCAGAACTTAAAAAGTCTCATCATT
GGAAAAAGCTTCTCGGGCGAAAACTCTCAAGGATCTTACGGTGTGAGATCCAGTTCGATGTAAACCACTCGTGCACCCAACTGA
TCTTCAGCATCTTTACTTTACCAAGCGTTTCTGGGTGAGCAAAAAACAGGAAGGCAAAATGCGCGCAAAAAAGGGAATAAGGGCGAC
ACGGAATGTTGAATACTCACTCTTCTTTTCAATATTATGAAGCATTTATCAGGGTTATTTGCTCATGAGCGGATACATATTG
AATGATTATGAAAAAATAAATAAGGGTTCGGCGCACATTTCCCGAAAAAGTGCCACCTGACGCTAAGAAACCATTAATTATCA
TGACATTAACCTATAAAAAATAGGCGTATCACGAGGCCCTTTCGCTCGCGGCTTTCGCTGATGACGGTGAACCTCTGACACATGC
AGCTCCCGGAGACGGTTCACAGCTTGTCTGTAAGCGGATGCCGGGAGCAGACAAGCCCGTCAGGGCGCGTCAGCGGTTGCGGG
TGTCGGGGCTGGCTTAACATGCGGCATCAGAGCAGATTGTACTGAGAGTGACCATATGCGGTGTGAAATACCGCACAGATGCGTA
AGGAGAAAAATACCGCATCAGGCGCCATTCCGCAATTACAGGCTCGGCAATGTTGGGAAAGGGCGATCGGTGCGGGCTCTTCGCTATTA
CGCCAGTGGCGAAAGGGGGATGTGCTGCAAGGCGATTAAAGTTGGGTAAACGCGAGGGTTTCCAGTCACGACGTTGTAACGAC
GGCCAGTGCCAAAGCTTGATGCTGCGAGGTCGACGACCGAGCGCGCCACCCAGCTATCCCGCGCGGGTCCGGACCCAAAAATAA
GCGGGCCCCCGCGCGCCCGTCCGGCGAGCGGGTGTATCTACGAACGGAAGTGGGAGCGGACTCGGAAGAGATTGTTAGAAAGGG
GAACACCATCGCGGACGGCCAGTGTCTGCGDAGCTGAGCGTGATTTGTTCAATTCTGACCTGTGGCATGTAAGGAACGTGCTC
GGGATCGGAGGGTGGCGGAGAGCCTTTCGGTGTGAGATTAGTAAGTGTACTGCGAAGCCGCGGAGGGGTAGGATGAGAGGTAG
ACAGGGTCGACGCCAGGTGCGAGAAGGACTGCAAGGACTGTTCTTCGACCGCGACCTGCAATTGCGCGCATGGATAGAATAGA
GCGTCGCCCTCGAGGGGACTCGACAGGGCTGGTGGTGGCGCCGACGCGGACTGGCTGGGCAATTTCAGATGGCGCGCAGTCCAG
GCCGCGCGCATGTGTTTATCCGTTTGTGCTAGTATCGATCGGATCTTTCGGCGTGGGTATAAAGCGCGCGCGCGCTCTCCCT
CTTCTCCAGCACTCCATCCAGAGCACTTCCCTCTCCATCGCATCCCATCACAAATAATGCCCATCAC

Figure 7 : Séquence nucléotidique du vecteur pEGT, contenant le promoteur du gène *gpd* (4480-5122), un marqueur de résistance à la phléomycine (507-1822) et le terminateur du gène *sc3* (71-507).

AGCTTCTCCGGCCCCGAATCGAACGGCAGGATGTGTGGGCGTGTCCAATATTGCCATGAAAACTGTGTGAGAAGTGAGCCCTCTCGTCAC
CCTGTACAGCTTCGCTGAGTTGAAAAAGCAGGGTTTCATCTTGGGCTCACTGATGCACTGAGCTCGACCGGAGAACTAAATGACCAGCCGG
AGTGTTCACCTAACTTAACGCCGGGTATTACAGGGCAGCTTCTCTATGTTGGCGCTACGACGTAGATCACCGCCCATGAACGGGGGAAACCG
GGGAGGGGTGCGTTTGGTACGTCTTTACGTCTGGCTATGTTGTATTGACCAGCGTCTGCAGAAAGATGGGACGACGATGCGCCGAGCCG
GCCAGTGTGTCGGGATGCCACTGTTGAGGCCATCCCTTTTGGCTAGACAGACGGGAAAGAGCTTTGGAGGTGCGATTCTCTACGAAATGGGA
AGGGGCTTAGATGGAGAGTGACACGTCTGAGCTCCCCAACACGCCTTCGCCGAGGGTGCCTCTCCGCGGACATTACCTCAGTTCAATTG
TTCTGACCTGCCTAATTGTATAGACCGGCCAACAACTTGTGACGCCCATATAACAGTGCCCTGCACAGAGCCTTCCCACTCAGTCGG
CGCTCCCTCAATCAATCCCACTAACTGCGCGGCTTCGCCCTTCGCCCTGCACACGTGCGCTTGGAAAGCGCCGCGACCGGCGTCCCG
TCCCTCCCTTCCCTCCGCGTCTGATGACACGACGCTTAATGTTGTGTCAGGCGAGCCGTAAGTATATTCAAAGGCGTAGCGAAATGAATAG
CAGGCGCGCGGGGACCTGGCAGCGCGGCGATGAACATGCAGACTTGGGTGACGATAACTTGAACAGACGCGCGGCGAAATGAATATCCA
AACGCGCGGGAAGAAAAATATTACGGGAGCCTCCCAAGGTATAAAGCCCTCACCCGCTCACTCTTCTCCAGTCGAACACCCCACT
TCAACTACCGAGCCCTTCTTCTCGCTATCTCTTCYTATCAACCTGCTCGCCATGGGATATCGCATGCTGCAGAGCTCTAGAGTCGAC
GGGCGCGGTACCGCGCGCGCTTAAGACGCGTGGATCCGCGAGGTGAACGCGCCTATCGGTGGGATATTCCGGCGACGGGAGCCTCGGC
AATCTGAGCCTCGTTACTGCTAGCAAAATTCGGAATCCCTCGATGTCTATAGGTGCGCGGACAAGTATCGTCTTGCTACATACTCCAAG
GTGTTGACTCATTCCTCGATAATGAACATTTGTTGTTGTTGTTGTTCTCTATCCGCTCAGTCACGCGACCCACACGTTGCTGTTGAAC
TTCCGCCACGCAACACCGCATGACGACATGGCGAACCTAAGTAAAGGCTGAGTCGTGGACTAAAGCACTTAAGCAGGAGTGC
CAGTCTACGTATGAATGAAGCCTCAGGTCCCGAAGTAAGGGGGTACAAAAGGAGGGTGAAAGGTGGACGTTTCTTACATCCTTCCA
CCTCCAGACACCATGCCGGGAAATCCCAAGCTTGTCTAAAAAGGTTTTCGCCGTACGCGCGGAAATTCCTTCGAGGTGGCCCTATCG
CATACATGCACGACTTCAAAACATCCATTCTATCATTTTGGGATCGTACAATTATTAGACATGTTGTACAACGTTTACCTTCTCTCT
TTACTCTCCGGCCCACTATGTAGAGGTAAAGTACAAGCGTCCAAAGGATGCGCATGAGTGGGATTAAGCACTTAAGCAGGAGTGC
AGCGCGCGTCTGCTTCGCCGCGTAGACGAGCAGGTGCGAGACACGCGGGAGTAGCCCCACTCGTTGTCTGACAGGCAATGAGCTT
CACGAAGCTCTGTGATGCGGATGCCGGGATCGATCCACGCGTCTTAAGGCGCGCGCGGTACCCCTCGGAACCGTCCGGCGCGCTC
GGACCGCGCGGTGTTGGTCCGGCTCGGTCACTGCTCTCCGCGCAAGTGCACGCAAGTTCGCCGCGCGGTGCGCGACGGCGCAACTC
CCGCCCCACGCGTGTCTGCCGATCTCGGTCAATGGCGCGCGCGAGGGCGTCCCGGAAGTTCGTGGACACGACCTCCGACCACTCGGCGT
ACAGCTCGTCCAGGCGCGCACCCACACCCAGGCCAGGGTGTGTCCGGCAACACCTGGTCTCGGACCGCGGTGATGAACAGGGTCAAG
TCGTCCCGGACACACCGCGGAAGTCTCTCCACGAAGTCCCGGAGAACCCGAGCCGCTCGGTCCAGAACTCGACCGCTCCCGGAC
GTCCGCGCGGTGAGCACACCGGACCGCACTGGTCAACTTGGCCATGCAATGGTGAATGGGCATTATGTGTGATGGGATGCGATGGGAGAG
GGAAAGTGTCTGGATGGGAGTGTGGAGAAAGAGGGAGACGCGGGCGCGCGCTTTTATACCCACGCGCGAAAGATCCGATCGATA
CTGACAAAAACGGGATGAACACATCGGCGCGCGCGCTGGAAGTTCGCGCCATTCGCAAAATGCCAGCCAGTCCCGTCCGGCGCGCAACCA
GCCCTGGTTCGAGTCCCGCTGAGGGCGACGCTCTATCTATCCATGCGCGCAATTCGAGGTGCGCGGTGCGAAGACGATCTTCGAGT
CCTTCTCGCACCTGGCTGCGACCTGTCTACCTCTACCTTCACTTCACTTCACTTCACTTCACTTCACTTCACTTCACTTCACTTCACTT
GCTCTCGCGCCACCTCCGATCCCGAGCAGCTTCCTTACATGCCACAGCGTCAGAAATGAACACAATGCACGTTCARATCAGATCCCCGG
GAATTCGTAATCATGGTCATAGCTGTTTCTGTGTGAAATTTGTTATCCGCTCACAATTCACACAACTACGAGCCGGAAGCATAAAGTG
TAAAGCTCGGGTGCCTAATGAGTGAGCTAACTCACTAAGTATGCTTTCGCTTTCGCTTTCGCTTTCGCTTTCGCTTTCGCTTTCGCTT
GCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGGCGTTTTCGCTATGGGCGCTCTTCCGCTTCTCGCTCACTGACTGCTGCGCTC
GGTCTGTTCCGGTTCGCGCGAGCGGATACAGCTCACTCAAAGGGCGTAATACGTTATTCACAGAAATCAGGGGATTAACGAGGAAAGAAC
ATGTGAGCAAAAAGGCCAGCAAAAAGGCCAGGAACCGTAAAAAGGCCGCTGTGCTGCGCTTTCCTATAGGCTTTCCTGCTGCTGCTG
ATCAAAAAATCGACGCTCAAGTCAAGGTGGCGAAACCCGACGAGGACTATAAGATACAGGCGTTCCTCCCTGGAAGCTCCCTCGTG
CGCTCTCTGTTCCGACCTTCCGCTTACCGGATACCTGTCCGCTTCTCTCCCTTCGGAAGCGTGGCGCTTCTCATAGCTACGCTGTA
GGTATCTCAGTTCCGTTGAGTCTGCTTCCGCTCAAGCTTGGGCTGTGTGACGAACCCCGCTTCAGCCGACCGCTGCGCTTATCCGTA
ACTATCGTTTGAAGTCCAAACCGGTAAGACACGACTTACGCCACTTACGCCACTTGGTAACAGGATTAGCAGAGCGAGGTATGTA
GGCGGTGCTACGAGTCTTGAAGTGGTGGCCTAACTACGGCTACACTAGAAGGACAGTATTTGGTATCTGCGCTCTGCTGAAGCCAGTT
ACCTTCGGAAGAGATTTGGTAGCTCTTGAATCCGGCAACAAACACCGCTGGTAGCGGTGGTTTTTTGTTTGAAGCAGCAGATTAACG
CGCAGAAAAAAGGATCTCAAGAAGATCCTTTGATCTTTTACCGGGCTGACGCTCAGTGAACGAAAACTCAGTTAAGGATTTT
GGTCATGAGATTATCAAAAAGGATCTTCACTTACCTTTTAAATTAATAAGTATTAATAATCAATCAATCAATCAATCAATCAATCAAT
TTGGTCTGACAGTTACCAATGCTTAATCAGTGAGGACCTATCTCAGCGATCTGTCTATTTCTGTTTCATTCATAGTTGCTGACTCCCGTC
GTGTAGATAACTACGATACGGGAGGGCTTACCACTGTGCCCGAGTGTGCAATGATACCGCGAGACCCAGCTCACCGGCTCCAGATTT
ATCAGCAATAAACACGAGCCGGAAGGGCGGAGCGCAGAAAGTGGTCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
GGGAAGCTAGAGTAAGATTCGCCAGTTAATAGTTTGCACACGTTTGTGCAATTGCTACAGGCATCGTGGTGTACGCTGCTGCTGCTGCT
GTATGGCTTCAATCAGCTCGGTTCCTCAACGATCAAGGCGAGTTACATGATCCCCATGTTGTGCAAAAAAGCGGTTAGCTCTTCCGTC
CTCCGATCGTTGTGCAAGTAAGTTGGCCGAGTGTATCACTCATGTTATGGCAGCACTGCATAATTCTCTTACTGTCTATGCCATCCGT
AAGATGCTTTTCTGTGACTGGTGAGTACTCAACCAAGTCACTTCTGAGAAATAGTGTATGCGGCGACCGAGTTGCTCTTCCCGCGCTCAAT
ACGGGATAATACCGCGCCACATAGCAGAACTTTAAAAAGTGTCTATCATTTGAAAAACGTTCTTCCGGGCGAAAACTCTCAAGATCTTAC
CGCTGTTGAGATCCAGTTTCGATGTAACCCACTCGTGCACCCAACTGATCTTCAGCATCTTTTACTTTCACACGCTTCTGGGTGAGCAA
AAACAGGAAGGCAAAAATGCCGCAAAAAGGGAATAAGGGCGACACGGAATGTTGAATACTCATACTCTTCTTTTCAATATTATGA
AGCAATTATCAGGGTTATTGTCTCATGAGCGGATACATATTGAAATGATTTAGAAAAATAAAATAAATAGGGGTTCCGCGCACATTTCCC
CGAAAAAGTCCACCTGACGTCTAAGAAACATTATATCATGACATTAACCTATAAAAAATAGGCGTATACGAGGCCCTTTCGCTCGC
GCGTTTCCGTTGATGACCGGTGAAAACCTCTGACACATGACGATCCCGGAGACGCTCACAGCTTGTCTGTAAGCGGATGCCGGGAGCAGAC
AAGCCCGTCAGGGCGCTACGCGGGTGTGGCGGGTGTGGCGGCTTACCTAAGTATGCGGCATCAGAGCAGATTGTATGAGAGTGCAC
CATATGCGGTGTGAAATACCGCACAGATGCGTAAGGAGAAAAATACCGCATCAGGCGCAATTCGCCATTCAAGCTGCGCACTGTTGGGA
AGGCGGATCGGTGCGGGCTCTTCGCTATTACGCCAGTGGCGAAAAGGGGATGTGCTGCAAGGCGATTAAGTTGGGTAAAGCCAGGGT
TTTCCAGTCACGACGTTGTAACGACGCGCCAGTGCCA

Figure 8 : Séquence nucléotidique du vecteur pESC, contenant le promoteur du gène sc3 (1-1033), un marqueur de résistance à la phléomycine (1540-2855) et le terminateur du gène sc3 (1104-1540)

CATGGGATATCGCATGCGCTGCAGAGCTCTAGAGTCGACGGGCCCGGTACCGCGGCCCGCTTAAGACGCGTGGATCCGCAGGTGAACGCGC
CTATCGGTGGGATATTGGGGCGACGGGAGCCTCGGCAATCTGAGCCTCGTTACTGCCTAGCAAATTCGGAATCCCTTCGATGTCATAGGGT
CGCGGACAAGTGATCGTCTTGCTACATACTCCAAGGTGTTGACTATTCCCTCGATAATGAACATTGTTGTTGTTGTTCTCTATCCGC
TCAGTCACGCGACCCACACGTCGATGCGTTGAACCTCGCCACGCAACAACCGCATGACGACATGGCGAACCTAAGTAAAGGCTGAGTCGT
GGACTAAAGCACTCCACTTTACGGCGAGGATGCCAGTCTACGTCATGAATGAAGCCTCAGGTCCCGAAGTAAAGGGGTACAAAAGGAGG
GTGAAAAGGTGGACGTTTCTTACCATCCTTCCACCTCCAGACCACCATGCGCGGAATTCACAGCTTGCTCAAAAAGGTTCTGCCGTACG
CCCGCGAAAATTCCTTCGAGGTGGCCCCATCGCATACATGCACGACTTCAAAACATCCATTCTATCATTTTGGGATCGTACAATTATTAGA
CATGTTGTACAACGTTACATTCCTTTCTTTTACTCTCCGGCCAGTCTATGTAGAGGTAAGTACAAGCGTCCAAAGGATCAGGCACTT
AGAGCGCGCGCTTGTCTCGCCGCTTAGAGCGCGCGCTCTGCTTCGCCGCTAGACGAGCAGGTGCGAGACACGGCGGGAGTAGCCCC
ACTCGTTGTCGTACCAAGCAATGAGCTTCACGAAGCTTGTCTGATCGGATGCCGGGGATCGATCCACGCGTCTTAAAGCGCGCCGCGGT
ACCCCTCGGACCCGTCGGGCGCGCTCGGACCGCGGTGTTGGTGGCGTGGTCACTCTGCTCTCGGCCACGAAGTGCACGCAGTTG
CCGGCCGGGTGCGCGAGGGCGAATCCCGCCCCACGGCTGCTCGCGCATCTCGGTTCATGGCCGGCCCGGAGGCGTCCCGGAAGTTCGTG
GACACGACCTCCGACCACTCGGCGTACAGCTCGTCCAGGCCGCGCACCCACACCCAGGCCAGGGTGTGTCGGGCACCACTGGTCTCGG
ACCGCGCTGATGAACAGGGTCACTGCTCCCGGACACAGCGCGGAATGCTCCACGAAGTCCCGGGAAGAACCCGAGCCGCGGTGTC
CAGAACTCGACCGCTCCGGCGACGTGCGCGCGGTGAGCACCGGAACCGCACTGGTCAACTTGGCCATGTCATGGTGATGGGCATTATGTG
TGATGGGATGCGATGGGAGAGGGAAGTGCTCTGGATGGGAGTGTGAGAGAAAGAGGGAGACGGCGGGCGCGCGCTTTTATACCCACG
CCGAAAGATCCGATCGATACGTAACAAACGGGATGAACACATCGGCGCGGCGCTGGACTGCGCGCATCTGCAAAATGCCAGCCAGTC
CCGTCCGGCGCCACCAAGCCCTGGTTCGAGTCCCCCTCGAGGGCGACGCTCTATTCTATCCATGCGCGCAATTGCAAGTTCGCGGTGCA
AGAACAGTCTTTCGAGTCTTCTCGCACCTGGGCTGCGACCTGTCTACCTCTCACTCAACCCCTCCGCGGCTTCGAGTACAGTTACTA
ATCTCACACCGAAGAGGCTCTCGCGCCACCTCCGATCCCGAGCAGTTCCTTACATGCCACAGCGTCAGAATTGAACACAATGCACGTC
ARATCAGATCCCGGGAATTCGTAATCATGGTCAATGCTGTTTCCGTGTGAAATTTGTTATCCGCTCAAAATCCACACAACATCAGGCC
GGAAGCATAAAGTGTAAAGCCTGGGGTGCTAATGAGTGAGCTAACTCACATTAATTGCGTTGCGCTCACTGCCCGCTTTCAGTTCGGGA
AACCTGTGTCGTCAGTGCATTAATGAATCGGCCAACCGCGCGGGAGAGGCGGTTTGGCTATTGGGCGCTCTTCGCGTCTCTCGCTCACTG
ACTCGTTCGCTCGTGTGTCGGCTGCGGCGAGCGGTATCAGCTCACTCAAAGGCGGTAATACGGTATCCACAGAATCAGGGGATAACG
CAGGAAAGAACATGTGAGCAAAAAGGCCAGCAAAAAGGCCAGGAAACCGTAAAGGCGCGGTTGCTGGCGTTTTCATAGGCTCCGCCCC
CCTGACGAGCATCAAAAAATCGACGCTCAAGTCAGAGGTGGCGAAACCCGACAGGACTATAAAGATACCAGGCGTTTCCCCCTGGAAG
CTCCCTCGTGGCTCTCTGTTCCGACCCCTGCGGCTTACCGGATACCTGTCGCGCTTCTCCCTTCGGGAAGCGTGGCGCTTCTCATAGCT
CACGCTGTAGGTATCTCAGTTCGGTGTAGGTGCTTCGCTCAAGCTGGGCTGTGTGTCACGAACCCCGCTTCAGCCGACCGCTGCGCTT
ATCCGGTAACATATCGTCTTGAGTCCAACCCGGTAAGACACGACTTATCGCACTGGCAGCAGCCACTGGTAACAGGATTAGCAGAGCGAG
GTATGTAGGGGTGCTACAGAGTCTTGAAGTGGTGGCCTAACTACGGCTACACTAGAAGGACAGTATTTGGTATCTGCGCTCTGCTGAAG
CCAGTTACCTTCGAAAAAGAGTTGGTAGCTCTTGAATCCGGCAAAACCAACCCGCTGGTAGCGGTGGTTTTTTTGTGTTGAAGCAGCAGA
TTACGCGCAGAAAAAAGGATTCAGAAAGATCCTTGTATCTTTCTACGGGGTCTGACGCTCAGTGGAAACGAAACGAAATGAGGGA
TTTTGGTCATGAGATTATCAAAAAGGATCTTCACCTAGATCCTTTTAAATTAATAAAGTTTAAATCAATCTAAAGTATATATGAGTA
AACTTGGTCTGACAGTTACCAATGCTTAACTAGTGAGGACCTATCTCAGCGATCTGTCTATTTGCTTCATCCATAGTTGCTGACTCCCCG
TCGTGTAGATAAATACGATACGGGAGGGCTTACCATCTGGCCCCAGTGTGCAATGATACCGGACACCCACGCTACCGGCTCCAGATT
TATCAGCAATAAACACGACGCGCGGAAGGGCGAGCGCAGAAAGTGGTCTGCAACTTTATCCGCTCCATCAGTCTATTAATTGTTGCC
GGGAAGCTAGAGTAAGTAGTTCGCCAGTTAATAGTTTGGCAACGTTGTTGCCATTGCTACAGGCATCGTGGTGTACGCTCGTCTGTTGG
TATGGCTTCATTACGCTCCGGTTCCTCAACGATCAAGGCGAGTTACATGATCCCCCATGTTGTGCAAAAAAGCGGTTAGCTCCTTCGGTCT
CCGATCGTTGTGAGAAAGTAAAGTTGGCCGAGTGTATCACTCATGTTATGGCAGCACTGCATAATCTCTTACTGTGTCATGCCATCCGTAA
GATGCTTTTCTGTGACTGGTGAAGTACTCAACCAAGTCATTCTGAGAATAGTGTATGCGGCGACCGAGTTGCTCTTGGCCGCGTCAATACG
GGATAATACCGCGCCACATAGCAGAACTTTAAAAAGTGTCTATCATTTGGAACAGTTCTTCGGGGCGAAAACTCTCAAGGATCTTACCGCT
GTTGAGATCCAGTTCGATGTAACCCACTCGTGACCCCACTGATCTTCAGCATCTTTTACTTTCACAGCGTTTCTGGGTGAGCAAAAAA
GGAAGGCAAAATGCCGCAAAAAGGGAATAAGGGCGACAGGAAATGTTGAACTCACTACTCTCTTTTCAATATTATTGAAGCATTT
TATCAGGGTTATTGTCTCATGAGCGGATACATATTTGAATGTATTTAGAAAAATAAACAAATAGGGGTTCGCGCACATTTCCCGAAAAAG
TGCCACCTGACGTCTAAGAAACCATTAATATCATGACATTAACCTATAAAATAGGCGTATCAGAGGCGCTTTCGTCGCGCGTTTCGG
TGATGACGTTGAAAAACCTCTGACACATGCAGCTCCCGGAGACGTCACAGCTTGTCTGTAAGCGGATGCCGGGAGCAGCAAGCCCGTCA
GGGCGCGTACGCGGTGTTGGCGGTGTCGGGGTGGCTTAACTATGCGGCATCAGAGCAGATTGTAAGAGTGCACCATATGCGGGT
TGAAATACCGCACAGATGCGTAAGGAGAAAAATACCGCATCAGGCGCCATTGCCATTACGGCTGCGCAACTGTTGGGAAGGGCGATCGGT
CGCGGCTCTTCGCTATTACGCCAGCTGGCGAAAGGGGATGTGCTGCAAGGCGATTAAAGTTGGGTAAAGCCAGGGTTTCCAGTCAAG
ACGTTGTAAAAACGACGGCCAGTGCCAAAGCTTAGATCTCCGAACCAAGAAATGCGATTGCGTTTACGGCCCAATTAAGAAATAAAGCTGCGTCA
GGGACGCGACGTATCTTGATCCATCATTTGACTCACCGGCATCGGCGTCAACACCAAAAGCAAGCTCGTCCACCCATAGGCGTGCACCGGC
CGCGTGCGCCATTGAGGTACATGAGCGGGGCGAAAGTCCGCCATTGGTAGCCCTGTGCTGGACGCGCGCGATGAACGTTTCCCAACCA
TTGGGAAGAAACGTCTCGGCCCCATCATCCCTTACCCGATGACAAGGCGCGTTCGCGCTTTGCCGAGAGGCCGGCGGGCGACATGCA

Figure 9 : Séquence nucléotidique du vecteur pELP, contenant le promoteur du gène laccase (4457-6983), un marqueur de résistance à la phléomycine (507-1822) et le terminateur du gène sc3 (71-507) (suite de la séquence, page suivante)

CAGCGAAGGTCCGTTGCGGATGGGAAGCAGGCAATCAGTGGGTGCTCTACGCCGCCACGATGGTTCGGGGAGCGTAGGCGCCCTCCCA
TAAGGCGGCAAGCATCATGATGCTCTCCGATTTCGGGAAGCCTGGTGGCATGCTGGAGAGACTCTCTCCGAGAGACCAGTGTGCGCAAC
GTTCTCGGCTTGAAGACTTTAAAGTGAGTGTAGAAGGGCGAGCAGAGGACGATCATCGGATTGCAAGGAACCATCGGCATCCTCAGC
CTGGGAAGGATGGCTCTTGGTAGACATTCCGCGAAGGTGTCTAGATGTGAGCGGGCTTCTGGATGATCATGTCTGAACCTTTTCTGA
CCTCGTCGGTGGTACGCATGGCAGGATTGAGCATTACGGTATGCCTCCCATTCATAAACGATAACCCCTTCCTTCAGGTTGGTCACTC
CATAGAGCGGCACGCTCTCAAGGCCTAGGCTATTCACACCTCTTCGCAACATCCCTATTCACGGTGTCTGTAAGGAACGACTTGTCA
GGGATCACATGAAGTGCAGCATACTGTTCCGCGGTCTCGCAGTACAGACGCTAGTACGGGAAGTCGACATCCAAGCGTTCAGTACCA
CATGGCAAAAAAGCTGCACCATACTCTTTATGGTGAGTTGTTCGTGAGTGGTATACAGTCATTTCATGAGGGAATGCCACCGGATAGG
GTGTGGCGGCCGCAATATTCATCGCCTGGCAATAGTCGATGTGCGCTTGTTCATGAATATCATGGGTCACATGTGGAGACGGTTAA
ACAGCGTTGACTGTGAATCCCTGGTGTGTGTGGGCCGAACAGGTACGTTGCAGGAACACCAATATCTCTTCGGCAGCCAGTTCCTTG
CGAGCGGCACAGGCAGGCATCGCGCAACAGATCCCAAGCCATCCGCGCTCTGACATTCGGGATACCTGAAGCCCTTCAGGTACGGAGC
GAAGAGGTGGGCTCTCTGCAGCGATTGGCGGACGGATAGCTGATTTCTCTCTCACCATGGGAAGATGTGAAAGGCTCCATCATAT
AGCGGCTCAACTCTACCTCGAATGTCCAAACAGCGCGGGAATACTTATTTATGTGGACAAGGCCGAGCTATGATAGCTTGCTCCCGAA
GTTGGTAAGTCCCGCAATCTGCGGTTTCAGGCAACAGTCTCGGAAAAATAAGAAATATTTAGGTGCGTGTAGGCGTATCGCCCAAA
TGCGCACACACGGAGGCTTTAGGAGATGAAGCGCCCGTGAGCGGTAAGGGAGTTGGTTACCGCCGCCCCGACCGACTCTCTCTCTT
CCCAGCATCATGTCTCGGCGCAAACTTTACCTCTATTGACCACTCCACGAGAAAGCAGGAACAGCTTCCTTGTCTCTCATGACGTCC
GCAATCCAGACCCCTTAGCCGGTTCTGTTACTCATCGTTATCCCTGCCGCCATCGTAGTGGAGTCAACCTGGCCAGTGCCTAGTCCCGTCT
CTCTTGCTGCACTAGAGAAAGCCCATGAGACAGCGTTTTTTGCTTATTTCTGCTGTTTCTATAGACACCATAGGGGCAAAACGATCCTG
CACGCCAGAGGATTGGGCTCGTCAGATTCCAGTTTTCTCTCGGTCTGAATCGGCTGCACGGCAGATAAATCGGCCGGAATGCT
ATAGCCCTTCATAGCCCGCTATGAGAGTCGCAAAAGGCTTGTGAGTCAGGTTCGGTTCGAGTGGCTCTCACGAAGAGCGTCAACTTCGEG
CGACAGCCGCTTTAGGGCAAGATAGATCCTCCCATCACTCCCTACTGCGCTCAGCGCCGGTACCGAACAATTGACTTACCGACATC
CTCCGGGACGCGCAAAATGCTGTTGACGGAACGTAATCCTCTTCGTCGCCGCTCTTTTCGCTCTACGCATTCCGTGTGGTTCGCGCGA
CGCCGCTCATCAGGACCAGACCACTCTCAATGTCTGGTACCGGCACAAATGGTGACACTGCGGCAACTGAGTAGGTCTGGTCACTCTG
GTGCAACGCTCGCTTACGCTGACCTTCGGGATACTGTCTGCAGACATCTGGAGCGCCTGTCTTCCCTAGTATAAATGATGTCTGTCC
GCAGGTCTTGAAGACCGCTCGAGTCCCACTTGAGTTTTAGGTAGGACCTGTTCTCCCAACCCCTCTTTC

**Figure 9 : Séquence nucléotidique du vecteur pELP (suite),
contenant le promoteur du gène laccase (4457-6983), un
marqueur de résistance à la phléomycine (507-1822) et le
terminateur du gène sc3 (71-507)**

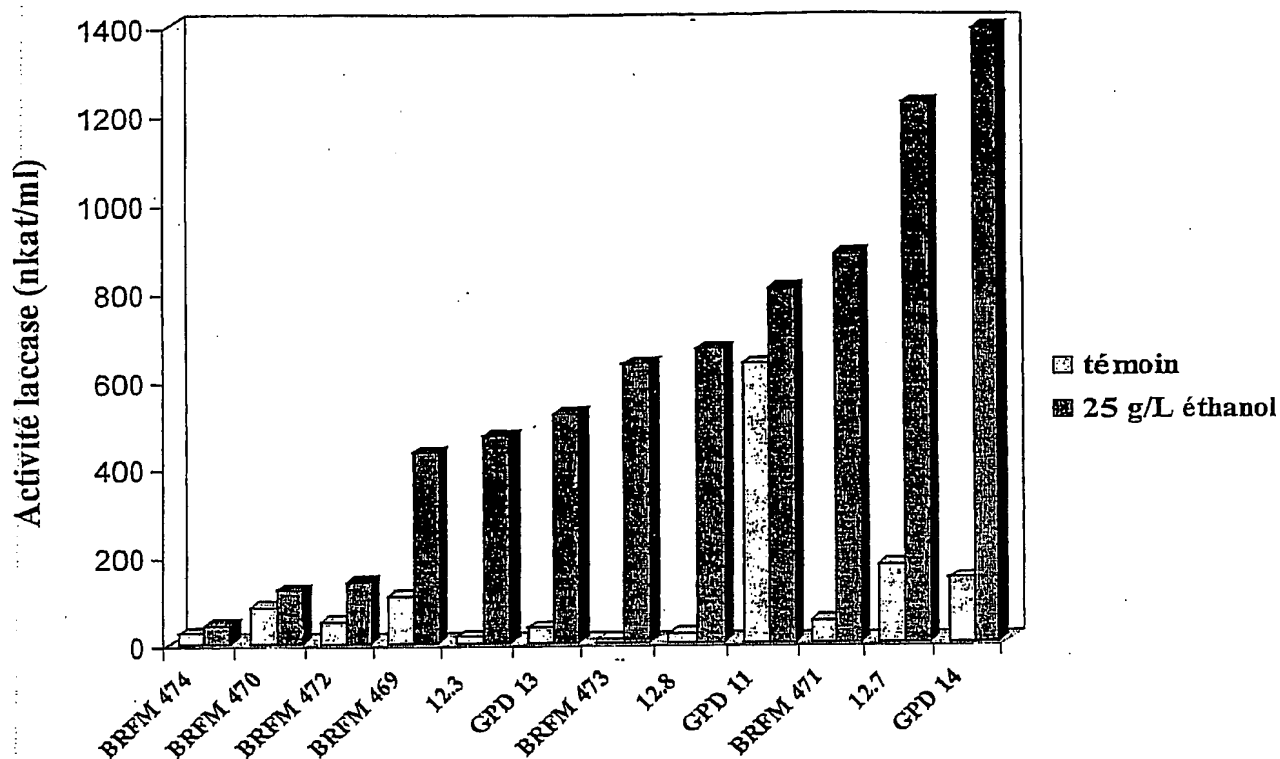


Figure 10 : Résultats de production des transformants présentant les activités les plus importantes. La culture a été effectuée avec ou sans (témoin) éthanol

12/13

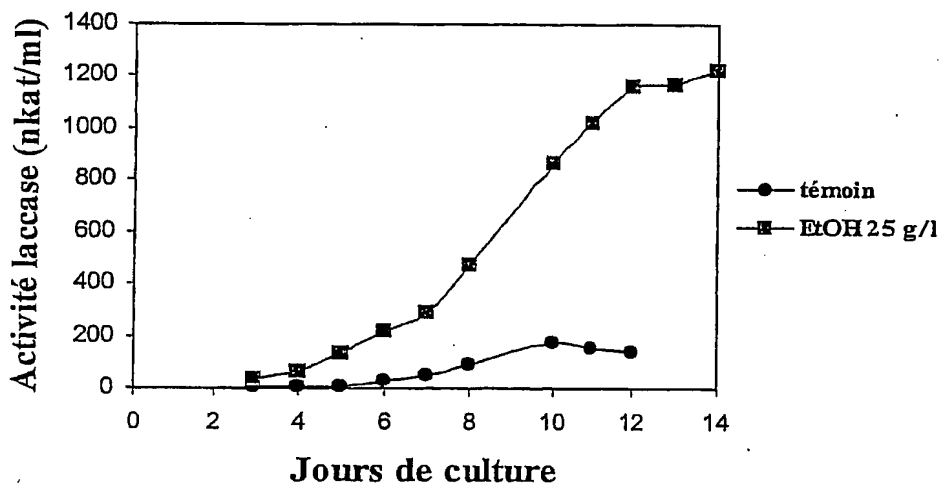
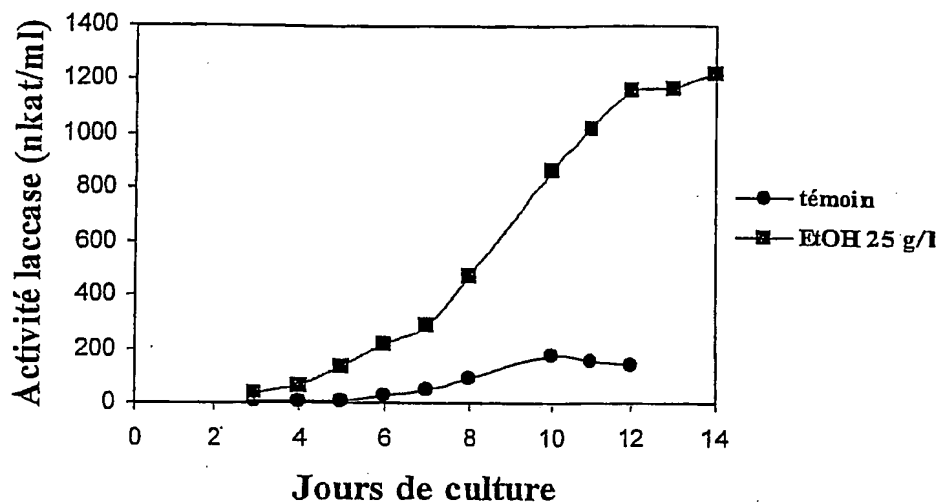


Figure 11 : Suivi des activités laccase des transformants GPD 14 et 12.7 en fonction du temps avec ou (témoin) sans éthanol

Gène de la laccase d'*Halocyphina villosa*

Figure 12

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